MMD Roaming Scenarios
- for CDG IRT Discussion -

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Outline

• MMD Roaming Considerations
• MMD Roaming Scenarios
  – Configuration
  – Tradeoff Analysis
• Additional Considerations
• Conclusions
MMD Roaming Considerations (1)

- Where should MMD service control be located?
  - S-CSCF, which is the central entity for MMD service control, should be in the home network.

- Should media traffic always go back to home network?
  - For real-time services, media traffic should not be required to be routed through home network, to avoid extra media latency.
  - The UE needs to use an IP address in visited network for media bearer.

- For MMD signaling, should UE use a Simple or Mobile IP address?
  - Mobile IP address is desirable for signaling, so that SIP sessions can survive CoA changes when UE moves between PDSNs or between EVDO and WLAN networks.
  - Simple IP address may suffice if it does not change frequently when UE moves around.

- For media bearer, should UE use a Simple or Mobile IP address?
  - Simple IP address is desirable for bearer, to avoid extra media routing through HA.
MMD Roaming Considerations (2)

• Should IPv6 or IPv4 be used for MMD?
  – *Either IPv4 or IPv6 may be used for MMD, but IPv6 is desirable, since UE needs to keep a stable IP address when it is connected to the network for MMD service, and since IPv6 address space is much larger than IPv4.*
  – *IPv6-over-IPv4 tunneling may be needed if visited network supports only IPv4.*

• Should visited network perform QoS based charging?
  – *This is a decision by individual operators.*
  – *If QoS based charging is supported, the same mechanism may be used for both MMD and non-MMD services.*

• Should visited network perform service based charging?
  – *This is a decision by individual operators.*
  – *One way to support this is to have P-CSCF in the visited network.*
  – *It is also possible to support some service based charging by adding service identifiers in PCRF interfaces to include service identifier.*
MMD Roaming Considerations (3)

• Is visited network required to support MMD?
  – If service based charging in the visited network is required, the visited network may need to support P-CSCF.
  – In some configurations, even though visited network does not support MMD, roamers may still obtain MMD services through home network.

• How can PCRF (Policy and Charging Rules Function) be deployed?
  – PCRF may be deployed without MMD. PCRF can support QoS control for both MMD and non-MMD services.
  – QoS information transfer between home and visited network domains can be supported by peering the PCRFs in the two networks.

• Should multiple MMD roaming scenarios be allowed?
  – MMD roaming configuration may depend on the capabilities of visited and home networks, although ideally, the same MMD roaming configuration should be used by all operators.

• What is the impact on packet data roaming for non-MMD services?
  – MMD roaming does not need to impact the existing configuration for packet data roaming for non-MMD services.
MMD Roaming - Scenario 1

- UE connects to home network through Mobile IP tunnel, for both signaling and bearer
- Same configuration as Mobile IP packet data roaming for non-MMD services
Analysis for Scenario 1

• Advantages:
  – *Visited network does not need to support MMD*
  – *IP address change in visited network does not trigger termination of SIP sessions*

• Disadvantages:
  – *Long round trip media latency even for local calls*
  – *Mobile IP support is required at visited and home networks*

• Other Considerations:
  – *QoS policy may be controlled through PCRF peering and SBBC*
  – *May be used to access home network services or non-real-time services*

• IP Address Assignment Options:
  – *Either MIPv4 or MIPv6 may be used for the UE*
MMD Roaming - Scenario 2

- UE connects to visited network P-CSCF for signaling; bearer traffic needs not go through home network
- UE obtains IP address or addresses from visited network
Analysis for Scenario 2

- **Advantages:**
  - *Low media latency for local calls*
  - *Mobile IP support is not required*

- **Disadvantages:**
  - *Visited network needs to support MMD*
  - *IP address change in visited network triggers termination of all SIP sessions*

- **Other Considerations:**
  - *QoS policy may be controlled through SBBC and PCRF peering*
    - In the current architecture, the H-PCRF decides the charging rules. The static charging policies reside in HSS and are fetched by H-PCRF during session setup
  - *May be used for roaming with 3GPP IMS networks*
Analysis for Scenario 2

• IP Address Assignment Options:
    - Same IP address is used for UE
    - Two different IP addresses are used for UE (preferred)
        - One for signaling
            - Should remain the same when UE moves around
            - May be a Mobile IP or Simple IP address
        - One for bearer
            - May change frequently
            - Should be a Simple IP address
    - Either IPv4 or IPv6 may be used
    - Either Mobile IP or Simple IP may be used
MMD Roaming - Scenario 3

- UE connects to home network P-CSCF for signaling; bearer traffic needs not go through home network
- UE obtains IP address or addresses from visited network
Analysis for Scenario 3

• Advantages:
  – Low media latency for local calls
  – Visited network needs not support MMD
  – Mobile IP support is not required

• Disadvantages:
  – IP address change in visited network triggers termination of all SIP sessions

• Other Considerations:
  – QoS policy may be controlled through PCRF peering and SBBC
  – May be used for roaming with networks not supporting IMS/MMD
Analysis for Scenario 3

• IP Address Assignment Options (same as Scenario 2):
  – *Same IP address is used for UE*
  – *Two different IP addresses are used for UE (preferred)*
    – One for signaling
      – *Should remain the same when UE moves around*
      – *May be a Mobile IP or Simple IP address*
    – One for bearer
      – *May change frequently*
      – *Should be a Simple IP address*
  – *Either IPv4 or IPv6 may be used*
  – *Either Mobile IP or Simple IP may be used*
MMD Roaming - Scenario 4

- UE connects to home network P-CSCF for signaling through Mobile IP tunnel; bearer traffic needs not go through home network
- UE uses home network Mobile IP address for signaling and visited network Simple IP address for bearer
Analysis for Scenario 4

• Advantages:
  – Low media latency for local calls
  – Visited network needs not support MMD
  – IP address change in visited network does not trigger termination of all SIP sessions

• Disadvantages:
  – Mobile IP support is required at visited and home networks

• Other Considerations:
  – QoS policy may be controlled through PCRF peering and SBBC
  – Mobile IP tunnel goes between HA and UE (instead of PDSN), if visited network supports IPv6/MIPv6
Analysis for Scenario 4

• IP Address Assignment Options:
  – **Two different IP addresses are used for UE**
    – Mobile IP address for signaling, assigned by home network
      – *Remains the same when UE changes its IP address in the visited network*
    – Simple IP address for bearer, assigned by visited network
      – *May change frequently*
  – **Either IPv4 or IPv6 may be used**
  – **If IPv6 is not supported, UE may obtain its IP addresses as follows:**
    – Get an IP address using IPCPv4, and use it as co-located care-of address (CCoA) for Mobile IPv4 operation; or
    – After getting an IP address from HA, use DHCPv4 to get another IP address for bearer transport
  – **L2TP can be used if Mobile IP is not supported**
Next Steps

• Operators need to decide on the requirements and priorities for MMD roaming
  – Different roaming scenarios may be applicable, depending on capabilities of visited and home networks
  – Ideally, one roaming architecture is desirable
  – Multiple roaming scenarios may need to be supported, as MMD networks are deployed and evolved

• Additional issues to be addressed:
  – Emergency calls in visited network
  – Overload access control in visited network

• A new work item on MMD roaming has been proposed in the June 2006 3GPP2 meeting
  – To specify MMD roaming architecture and protocols
  – Proposed schedule:
    – Stage 1 completion: 12/06
    – Stage 2/3 completion: 8/07
Thank you!